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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/625,710	07/25/2000	Alfred E. Keller	1856-00301	6545

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DAVID W. WESTPHAL
CONOCO PHILLIPS
P.O. BOX 1267
PONCA CITY, OK 74602-1267

EXAMINER
RUDNICK, DOUGLAS W

ART UNIT	PAPER NUMBER
1764	13

DATE MAILED: 12/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/625,710	KELLER, ALFRED E.	
	Examiner	Art Unit	
	Douglas W. Rudnick	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 October 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-12,15-17,21-23 and 25-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-12,15-17,21-23 and 25-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2 and 8* .
4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The language of claim 23 is directed toward method limitation. Disclosing reactions that take place has no structural limitation and does not further define any structure of the system.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 8, 15, 17, 21, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over De Jong et al. (US 5720901) in view of Kiliany et al. (US 5512260).

De Jong et al. discloses a system for the partial combustion of hydrocarbons comprising:

With respect to claim 8, A hydrocarbon, a hydrogen sulfide, and an oxygen injection line in communication with each other (col. 5, lines 32-35) and (claim 13, lines 44-49). It would be obvious for one of ordinary skill in the art to deduce from De Jong et al. that if the streams need to be well mixed prior to the catalyst, they are introduced separately.

A reaction zone (2)

A catalyst (col. 4, lines 1-6)

At least one cooling zone is downstream from the reaction zone (col. 8, lines 4-12)

A sulfur removal unit (Fig. 1, 22)

De Jong et al. is silent to the sulfur removal unit being a sulfur condenser. Kiliany et al. teaches a sulfur condenser for the purpose of removing sulfur from the product gas of an oxidation reactor (Abstract).

It would have been obvious to one of ordinary skill in the art at the time Applicants' invention was made to have implemented the sulfur condenser of Kiliany et

al. for the sulfur removal unit in De Jong et al. because both units' purposes are for removing sulfur from a product stream coming from an oxidation reactor.

With respect to claim 15, De Jong et al. discloses a tailgas processing unit downstream from the cooling zone (22) which can be a sulfur condenser as taught by Kiliany et al. in claim 8 above.

With respect to claim 17, the catalyst used contains rhodium (claim 8).

With respect to claim 21, DeJong et al. discloses the invention substantially as claimed. However, DeJong is silent to the system comprising a gas reactor having feed inlets, a boiler, a condenser, a heater, and a tail gas clean-up unit. Kiliany et al. teaches a system comprising a gas reactor having feed inlets (Fig. 1C, not labeled), a boiler (Fig. 1C, 63), a condenser (Fig. 1C, 76), a heater (Fig. 1A, 40), and a tail gas clean-up unit (Fig. 1A and Fig. 1B) for the purpose of reducing sulfur content in a gaseous stream.

It would have been obvious to one of ordinary skill in the art at the time applicants' invention was made to have provided a system comprising a gas reactor having feed inlets, a boiler, a condenser, a heater, and a tail gas clean-up unit in DeJong et al. in order to reduce the sulfur content in a gaseous stream as taught by Kiliany et al.

With respect to claim 22, DeJong et al. discloses the invention substantially as claimed. However, DeJong et al. is silent to a cooler for receiving gas from the tail gas unit, and a quench tower. Kiliany et al. teaches a cooler (Fig. 1C, 64) for receiving gas from the tail gas unit, and a quench tower (col. 6, lines 2-5) for the purpose of cooling and quenching the tail gas product.

It would have been obvious to one of ordinary skill in the art at the time applicants' invention was made to have provided a cooler for receiving gas from the tail gas unit, and a quench tower in DeJong et al. in order to cool and quench the tail gas product as taught by Kiliany et al.

With respect to claim 25, tail gas processing unit comprises a sulfur absorbing material (col. 8, lines 21-27).

4. Claims 9, 11, and 12 rejected under 35 U.S.C. 103(a) as being unpatentable over DeJong et al. in view of Kiliany et al. and Heck et al. (US 4844837)

With respect to claim 9, the modified apparatus of DeJong et al. discloses the invention substantially as claimed. However, the modified apparatus of DeJong et al. is silent to a mixing zone upstream from the reaction zone. Heck et al. teaches a mixing zone upstream from the reaction zone (Fig. 2, 14) for the purpose of mixing the reactant before they reach the reactor.

It would have been obvious to one of ordinary skill in the art at the time applicants' invention was made to have provided a mixing zone upstream from the

reaction zone in the modified apparatus of DeJong et al. in order to mix the reactants before they reach the reactor as taught by Heck et al.

With respect to claim 11, DeJong et al. discloses an oxygen line that communicates with the reaction zone (col.7 65-67)

With respect to claim 12, DeJong et al. discloses a mixing zone that receives oxygen from the oxygen injection line (6 and 4)

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over De Jong et al. in view of Kiliany et al. and Dubois et al. (US 5472920).

The modified apparatus of De Jong et al. discloses the invention substantially as claimed. However, the modified apparatus of De Jong et al. is silent to having a thermal barrier between the mixing zone and the reaction zone. Dubois et al. teaches a thermal barrier that can be used between the mixing and reaction zones (col.1, lines 11-14) in a reactor for the purpose of preventing excess heating of certain components that when exceeding acceptable limits have deterioration in their properties.

It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have provided a thermal barrier between the mixing zone and the reaction zone in the modified apparatus of De Jong et al. in order to prevent excess heating of certain components that when exceeding acceptable limits have deterioration in their properties as taught by Dubois et al.

6. Claim 16 rejected under 35 U.S.C. 103(a) as being unpatentable over De Jong et al. in view of Kiliany et al. and Goetsch et al. (US 5654491).

The modified apparatus of De Jong et al. discloses the invention substantially as claimed. However, the modified apparatus of De Jong et al. fails to disclose a catalyst supported on wire gauze. Goetsch et al. teaches a catalyst supported by wire gauze (claim 2) for the purpose of maximizing surface area, therefore maximizing reaction sites. It would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to have provided a catalyst supported by wire gauze in order to maximize reaction sites as taught by Goetsch et al.

7. Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeJong et al. in view of Heisel et al. (US 5676921).

With respect to claim 26, DeJong et al. discloses the invention substantially as claimed. DeJong et al. discloses a means for effecting catalytic partial oxidation (abstract) in a single reaction zone (Fig. 1, 2) of a short time reactor (col. 6-7 lines 66-2), means for maintaining temperature (claim 6), means for cooling (col. 8, lines 11-12), and means for recovering product gas (col. 8, lines 13-20). However, DeJong et al. is silent to a means for recovering elemental sulfur. Heisel et al. teaches a means for recovering elemental sulfur (title and abstract) for the purpose of having useful sulfur at the end of the process.

It would have been obvious to one of ordinary skill in the art at the time applicants' invention was made to have provided a means for recovering elemental sulfur in DeJong et al. in order to have useful sulfur at the end of the process as taught by Heisel et al.

With respect to claim 27, DeJong et al. discloses means for removing sulfur from synthesis gas product stream (col. 8, lines 21-27).

With respect to claim 28, DeJong et al. discloses means for maintaining temperature in the reaction zone above 500 degrees C. (claim 6).

INTENDED USE IS OF NO PATENTABLE MOMENTS IN APPARATUS CLAIMS.

Response to Arguments

8. Applicant's arguments with respect to claims 8-12, 15-17, 21-23, and 25-28 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant points out that amending claim 23 to depend on claim 17 instead of claim 8 would make claim 23 proper for examining. Even though claim 23 now includes the structural limitation of claim 17, it still does not further limit any structure of the

system no matter what claim it is dependent on. In addition, De Jong et al. discloses the same reactants in a same partial oxidation reaction for H_2S and light hydrocarbons. So very most likely, the actual reaction occurring is the same as the one disclosed in claim 23.

10. Applicant points out that De Jong et al. does not inherently teach that the reactant lines are introduced separately. Examiner has withdrawn the 35 U.S.C. 102 rejection that included this limitation taught by inherency, and has formed a new 35 U.S.C. 103 rejection that includes this limitation. Also in the new 35 U.S.C. 103 rejection for claim 8 is the limitation directed toward the sulfur condenser.

11. Applicant points out that De Jong et al. fails to disclose a reaction zone that has a catalyst for partial oxidation of H_2S and light hydrocarbons and a product stream of carbon monoxide, hydrogen gas, sulfur, and water. As shown in the rejection above, De Jong does teach a reaction zone and a catalyst. De Jong et al. also teaches that the apparatus is used for catalytic partial oxidation (Col. 3, lines 34-36) of light hydrocarbons (Col. 4, lines 20-25) and H_2S (Claim 14), which is the same process intended for the instant invention. It is obvious if the same reactants are used in the same process, the products should be the same as well. In addition, De Jong does disclose products of carbon monoxide, hydrogen gas (Col. 4, lines 15-17), and sulfur (Col. 8, lines 21-23).

12. Applicant points out that elemental sulfur as a product is not taught by De Jong et al. With the combination rejection of De Jong et al. and Kiliany et al., Kiliany teaches that elemental sulfur is a product.

13. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant points out certain limitations that De Jong et al. does not recite (i.e. sulfur condenser), when these limitations are taught by a combination of references.

14. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

15. Applicant points out that Heisel et al. teaches away from a reaction zone operating above 500 degrees C. Heisel et al. is not used to teach this limitation. The

primary reference, De Jong et al. teaches this limitation. Heisel is **only** used to teach the limitation stated in the rejection above.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5232467, US4684514, US 6103773, US 5185140, and US 5458808.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W. Rudnick whose telephone number is 703-305-3141. The examiner can normally be reached on M-F (8:30 am - 5:30 pm) alt. fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700

Douglas W. Rudnick
Art Unit 1764

dwr
December 4, 2002